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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,194	11/17/2003	Hiroki Maeda	123848.01	9579

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ALEXANDRIA, VA 22320

EXAMINER

VO, HAI

ART UNIT	PAPER NUMBER
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1771

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/713,194	Applicant(s) MAEDA ET AL.	
	Examiner Hai Vo	Art Unit 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13 and 16-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. The art rejections based on Fujumura and EP 763 532 have been withdrawn in view of Applicants' arguments. In Fujumura and EP'532, the information is recorded by applying electric fields to the liquid crystal material, which is entirely different from the basis concept of the claimed invention. The information of the present invention is recorded by application of thermal energy.
2. The art rejections based on Shimizu in view of Fujumura are maintained.
3. The 112 claim rejections have been withdrawn in view of the present amendment.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 13, 16, 17, and 19-23 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over EP 860 417. Hanna et al (US 6,174,455) will be relied on as an equivalent form of EP 860 417 for convenience.

Hanna '455 teaches a space light modulating device comprising a substrate, a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (example 5). Hanna '455 teaches the electrodes made from ITO which is transparent to light. Hanna '455 discloses the liquid crystal material comprising 2-(4'-octylphenyl)-6-dodecyloxynaphthalene (example 5). Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. Information is recorded by application of thermal energy to the area of the medium and recorded information can be read by detecting a change in current value upon light irradiation in accordance with the light modulating device as evidenced by Hanna et al (US 6,224,787). A gap between the electrodes is about 2 microns (example 5). Since the optical modulating device of Hanna '455 comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete. Accordingly, Hanna '455 anticipates or strongly suggests the claimed subject matter.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 860 417 as applied to claim 13 above, in view of EP 763 532. Hanna et al (US 6,174,455) will be relied on as an equivalent form of EP 860 417 for convenience. Hanna '455 does not specifically disclose a liquid crystal material comprising 2-(4'-

heptyloxyphenyl)-6-dodecylthiobenzothiazole. EP 763 532, however, teaches a space light modulator comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for 2-(4'-octylphenyl)-6-dodecylloxynaphthalene since two compounds have been shown in the art to be recognized equivalent liquid crystal materials for use in space light modulators.

8. Note that a declaration under 37 CFR 1.132 was filed on 07/20/2005 for establishing the invention disclosed but not claimed in the Hanna '455 reference was derived from Junichi Hanna of this application and is thus not an invention "by another". However, the obviousness rejections will not be withdrawn until a translation of a foreign priority document JP 11-002955 is submitted to make EP 860 417 available as 102(a) prior art.
9. Claims 13, and 16-23 are rejected under 35 U.S.C. 103(a) as being obvious over EP 864 631 in view of Kawasumi et al (US 5,645,758). Hanna et al (US 6,224,787) will be relied on as an equivalent form of EP 864 631 for convenience.

Hanna '787 teaches an optical sensor comprising a substrate, a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 13). Hanna '787 teaches the electrodes made from ITO which is transparent to light. Hanna '787 discloses the liquid crystal material comprising 2-

(4'-octylphenyl)-6-dodecyloxynaphthalene and 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole (examples 1 and 2). Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. Hanna '787 teaches that the information is recorded by application of thermal energy to the area of the medium and recorded information can be read by detecting a change in current value upon light irradiation (column 377, lines 25-30). Hanna '787 does not teach a thickness of the gap between the electrodes. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the information recording medium having a gap between the electrodes with a thickness as described by Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics. Since the resulting information recording medium of Hanna '787 as modified by Kawasumi comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from

the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

10. It is suggested that the translation of a foreign priority document JP 11-002955 is required to make EP 864631 available as 102(a) prior art. A declaration under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another" is further needed to overcome the obviousness rejections.
11. Claims 13, and 16-23 are rejected under 35 U.S.C. 103(a) as being obvious over Kawasumi et al (US 5,645,758) in view of EP 763 532. Kawasumi discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi teaches the electrodes made from ITO which is transparent to light. Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Kawasumi does not disclose the use of the liquid crystal as set forth in the claims. EP '532, however, teaches an optical sensor comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention

was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for the liquid crystal material motivated by the desire to provide excellent in high-quality charge transport capability and higher durability.

Since the resulting information recording medium of Kawasumi as modified by EP '532 comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

Note that the liquid crystal composition of Kawasumi comprises a liquid crystal material and a second substance dispersed therein for effectively forming liquid crystal domains. The amendments that exclude the presence of the second substance from the liquid crystal composition would exclude Kawasumi as prior art.

12. Claims 13, and 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-043581 in view of EP 763 532 and Kawasumi et al (US 5,645,758).

Shimizu et al (US 5,905,547) will be relied on as equivalent forms of JP 09-043581 for convenience. Shimizu teaches an information recording medium comprising a substrate, a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 2). The information is recorded by using laser head or electric fields (column 10, line 9-10). Shimizu does not teach the liquid

crystal material as set out in the claims. EP '532, however, teaches an optical sensor comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP '532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the liquid crystal material as set out in EP '532 motivated by the desire to provide excellent in high-quality charge transport capability and higher durability.

Shimizu does not specifically teach a thickness of the gap between the electrodes. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the information recording medium having a gap between the electrodes with a thickness as described by Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics. Since the resulting information recording medium of Shimizu /Hanna '787/ Kawasumi comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present

specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

13. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-043581 in view of Fujumura et al (US 4,946,260) as evidenced by Clark et al (US 5,227,905). Shimizu et al (US 5,905,547) is relied on as an equivalent form of JP 09-043581. Shimizu teaches an information recording medium comprising a substrate, a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 2). Shimizu teaches the liquid crystal material having a chiral smectic C and Clark evidences that a liquid crystal having a chiral smectic C is rod-shaped. Therefore, Shimizu discloses the liquid crystal material substantially having a rod-shape. Shimizu discloses that information is recorded by using laser head (column 10, line 9-10). Shimizu does not specifically teach a thickness of the gap between the electrodes. Fujumura, however, discloses an information recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 1. Fujumura discloses a gap between the electrodes having a thickness of 5.19 microns within the range as disclosed in the present specification (table 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the information recording medium having a gap

between the electrodes with a thickness as described by Fujumura motivated by the desire to provide the shutter with a high-speed response characteristics. Since the resulting information recording medium of Shimizu as modified by Fujumura comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

14. The art rejections based on Shimizu in view of Fujumura have been maintained for the following reasons. Applicants argue that Shimizu's information is not recorded by application of thermal energy. The examiner respectfully disagrees. Shimizu's information is not recorded by application of thermal energy or electric fields (column 10, line 9-10). Therefore, Shimizu is properly combinable to Fujumura to achieve the claimed invention. Applicants further argue that Shimizu requires a photoconductive layer for charge generation, which is completely different from the basic concept of the present invention. The arguments are not found persuasive because they are not commensurate in scope with the claims. The "comprising" does not preclude the information recording medium from having a photoconductive layer as required by Shimizu. Note that Clark is not relied upon as a basis for rejection of the claimed invention but rather an evidence to establish that a smectic C liquid crystal is substantially rod shaped.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HV


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